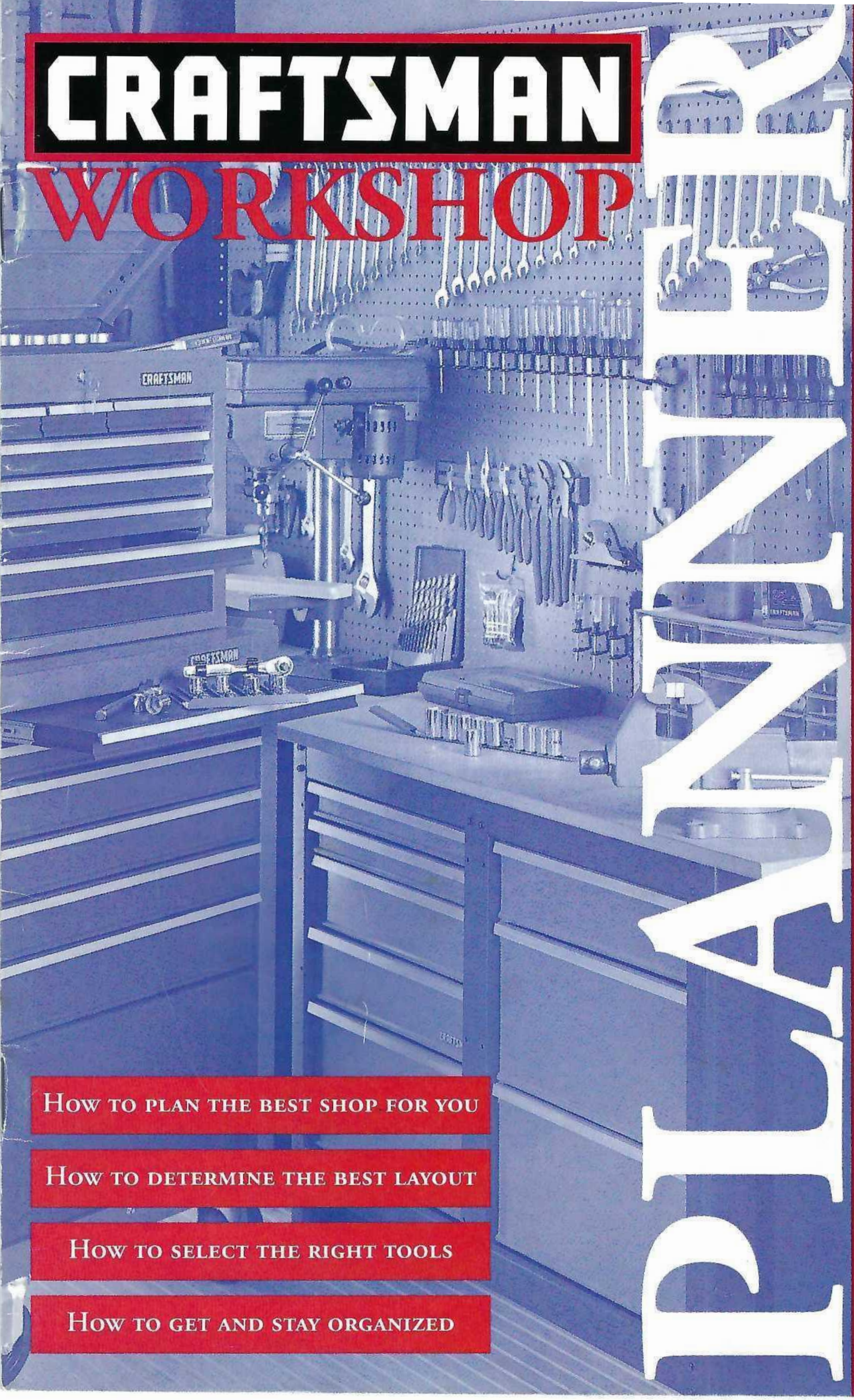
CRAFTSMAN
WORKSHOP
PLANNER



How to plan the best shop for you

How to determine the best layout

How to select the right tools

How to get and stay organized

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CODE OF THE SHOP

Visit a number of professional workshops, and you will find that what they have in common is not only the types of tools they have, but how they are used. All seasoned workshop pros will tell you that using a shop safely is always the overriding consideration. No matter what kind of tools you own, or how fancy your shop is, putting safety first is the key to both maximum productivity and enjoyment.

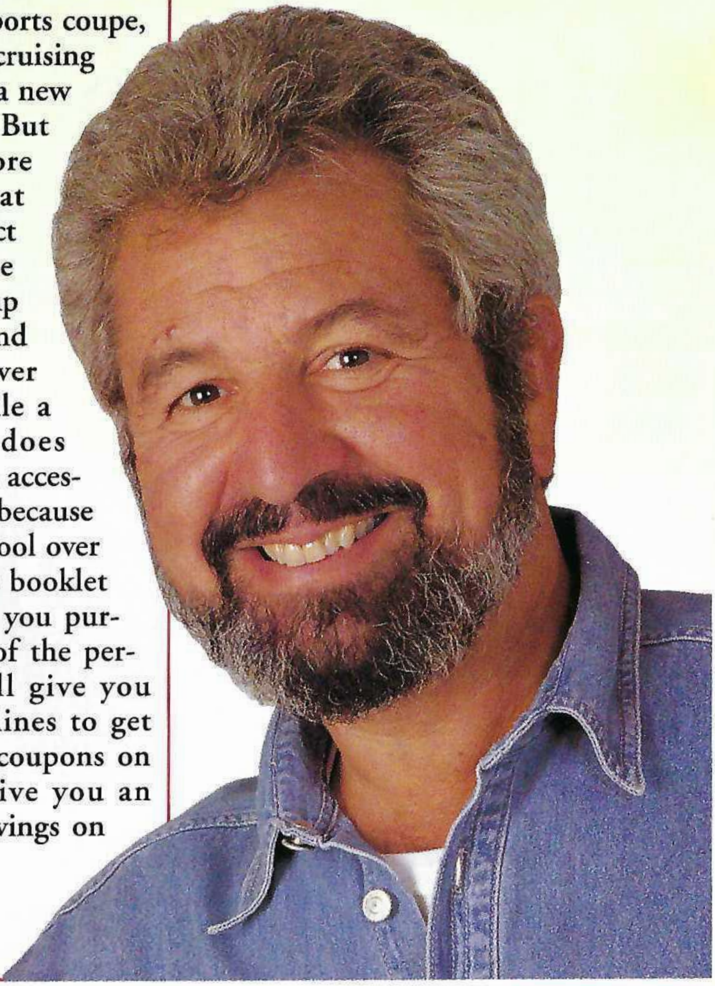
All professionals agree that no project is worth even the smallest accident. As you accumulate workshop tools and test their capabilities, always keep safety as your top priority.

The basic rule of thumb behind using your shop safely is: "If you are not sure of what you are doing, stop and get more information before proceeding." Keep this rule of thumb in mind, whether you are just setting up your workshop, using a new tool, or working on a project. Review all the available manuals, plans, and procedures carefully. Then if any doubts or questions remain, get more advice from qualified experts or authorities.

PURSUING THE DREAM

"Some of us might have a dream of owning a new Jaguar sports coupe, while others dream of cruising the blue Caribbean on a new 50-ft. Hatteras yacht. But most of us pursue more practical ambitions that include having a perfect home workshop, one fully equipped and set up with plenty of space and light to handle whatever task we ask of it. While a top-gun workshop does require investment, it is accessible to most everyone because it can be built tool by tool over a period of time. This booklet was assembled to help you pursue your own version of the perfect workshop. It will give you some ideas and guidelines to get you started. Plus, the coupons on pages 4 and 5 will give you an inside track to great savings on America's #1 tools."

Bob Vila



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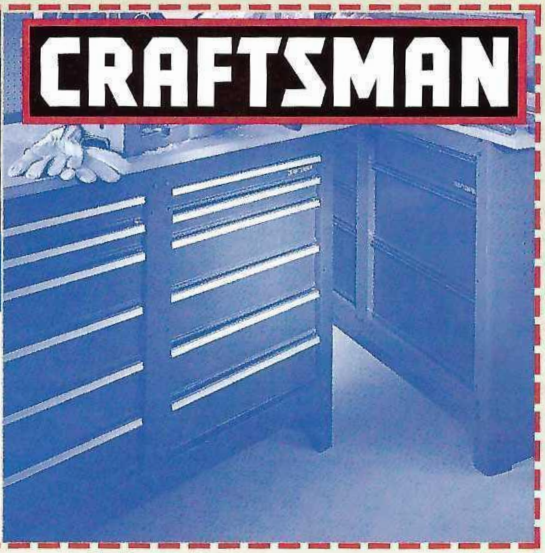

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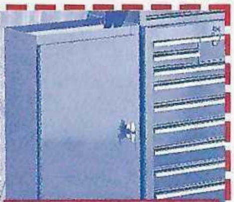

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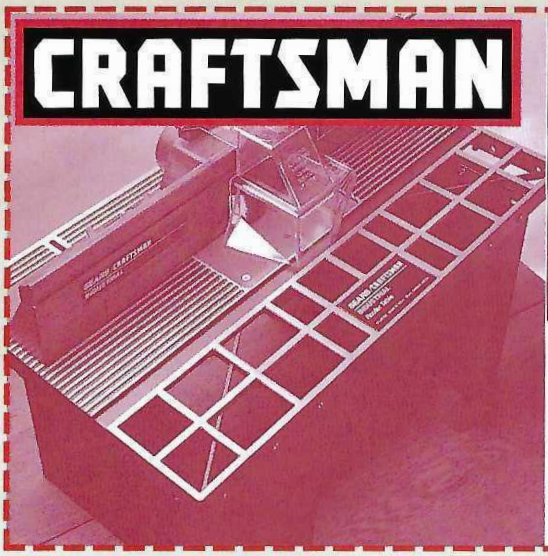

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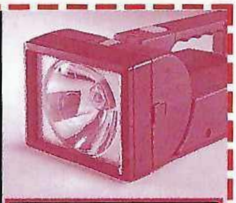

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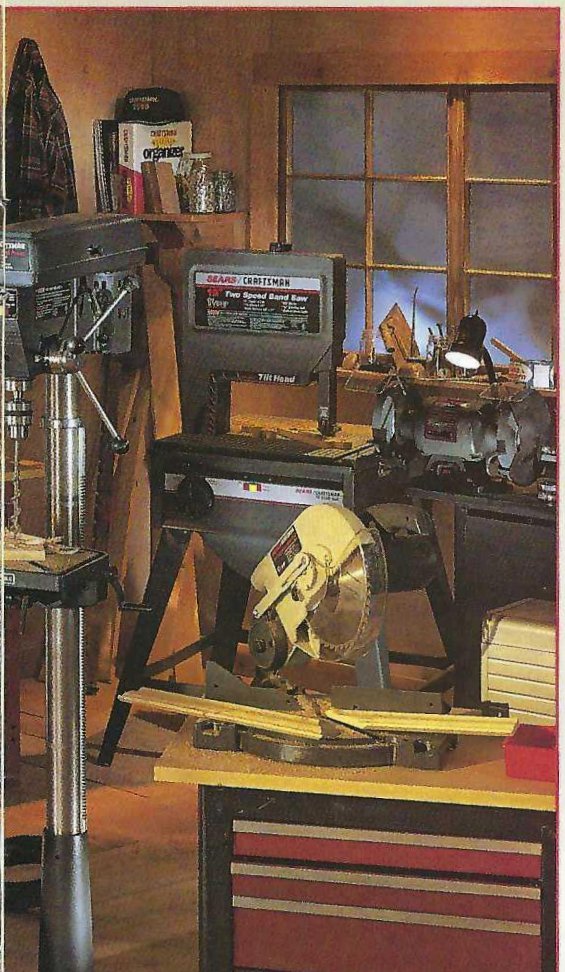


A Basic Approach. Workshop tools fall into three general categories: portable, bench-top, and stationary (floor model) tools. A basic start-up workshop can be put together with portable electric tools for a total budget of under $600, and these tools will remain useful no matter how sophisticated your skills or ambitions become. Likewise, bench-top tools like power saws and drills can be useful even if you add a full array of floor-model tools later.

THE PERFECT WORKSHOP

Simply defined, the perfect workshop is one that works unusually well for the specific projects that you plan to tackle. Even if your neighbor says he has a perfect shop, his workshop may not fit your own needs. Or, he may have his set up in a two-car garage, and you may have only half the space. Though there are certain guidelines to consider, no one can tell you exactly how to set up a workshop that is perfect for you.

You can, however, learn from others. Visit other workshops and ask the owners what works best for them. Most will be more than happy to tell you, and most will be extremely frank about how their tools and shop layout perform for them. Other sources for ideas include books, magazines, videos and TV programs like *Home Again.* One good book to get when setting up a shop is *The Home Workshop Planner* which covers suggestions for laying out a variety of shops from scratch. It is available in bookstores or directly from the publisher (see back cover).

Meanwhile, use this booklet as a place to start. It will give you some perspective on selecting the best tools for your shop, and also some ideas on how to arrange them in the space you have available. Shop arrangements and proper tool storage can have a big impact on how well your shop will work for you. But keep in mind that no one particular arrangement is etched in stone. If you have an idea for an arrangement that might work better, try it. Rearranging bench-top tools is simple, and caster sets on stationary floor model tools can make them easy to move around as you experiment.

As you consider setting up your own personal workspace, follow the "rule of plenty" for the basics: Try to have as much space, climate control, light, electrical outlets, work surfaces, and storage as you can possibly muster. Using this rule, plan out what you can. But don't delay in getting started on setting up your own workshop. If you must, start out small and expand. The sooner you get started, the sooner you will be able to enjoy the magic that every home workshop has to offer.

INVESTING IN A HOME WORKSHOP

The old saying goes that a good workman never blames his tools. But if you have struggled with inadequate tools, tried to make do without the right tools for the task at hand, or have used tools equipped with the wrong accessories, you know that this old adage is only partially true.

To finish any project with professional-grade results, it is essential to use quality tools designed for the job. The payoff from making regular additions to your tool arsenal (adding either new tools or upgrading tools you already have) will be the continual improvement in your workshop's capabilities. By adding to the tool power of your shop, you will be able to take bigger steps toward perfecting your craftsmanship.

Accumulating quality tools will let you concentrate on your skills in using them. Fortunately, you don't have to buy a workshop-full of tools all at once. You can start out in a small way and make additions and improvements to your tool line-up as you go.

Likewise, the same is true for the shop where you keep those tools. You can begin with a simple start-up workshop in the corner of the basement or garage. Later on, as you develop a feel for your needs, you can upgrade your shop's layout to handle more and bigger projects. The tool groupings below will give you an idea of how you might build up your workshop tool inventory.

The tools are listed by groups to fit the spaces on the opposite page. The Stage II Workshop would accommodate tools from Groups I and II, etc. The list is only a partial summary of tools available and does not include accessories. Modify it according to your project needs, budget, and space. A good rule of thumb is that if you can't afford the best, then buy the second best and upgrade later. If you decide to sell the originals later, you'll find there is a good market for tools that have been handled with respect.

A SAMPLE TOOL-BUYING CHECKLIST

Though few shop owners will come up with the same tool wish lists, most often the first priority is either a tablesaw, bandsaw, or radial-arm saw, followed by equipment to dress up lumber, such as a planer, jointer, shaper, lathe, and drill press. From there on, the equipment you'll want will depend to a large degree on the projects you end up building most often.

Many shop projects can be built with just a major workshop saw, a drill press, and a good router with accessories, along with an assortment of hand tools.

Priority hand tools for woodworking include a good set of chisels and a good plane. To use either of these tools successfully, you will need to learn how to keep their edges sharp. Knowing how to maintain edges on these and other workshop tools will boost your project success ratio.

GROUP I

☒ *Circular saw* $ ____
☐ *Sabersaw* $ ____
☒ *Power drill, 3/8"* $ ____
☒ *Router* $ ____
☒ *Bench grinder* $ ____
☐ *Sander, pad* $ ____
☐ *Sander, palm* $ ____
☐ *Miter box, hand* $ ____

GROUP II

☐ *Tablesaw, bench** $ ____
☐ *Power miter saw* $ ____
☐ *Stapler/nailer* $ ____
☒ *Scrolling sabersaw* $ ____
☐ *Drillpress, bench** $ ____
☐ *Belt sander, 3x24"* $ ____
☒ *Air compressor* $ ____
☒ *Shop vacuum* $ ____

GROUP III

☐ *Tablesaw, floor* $ ____
☐ *Scrollsaw* $ ____
☐ *Bandsaw, bench** $ ____
☒ *Drill press, floor* $ ____
☐ *Belt-disc sander* $ ____
☐ *Jointer* $ ____
☒ *Air tool set* $ ____
☒ *Drill-driver, cordless* $ ____

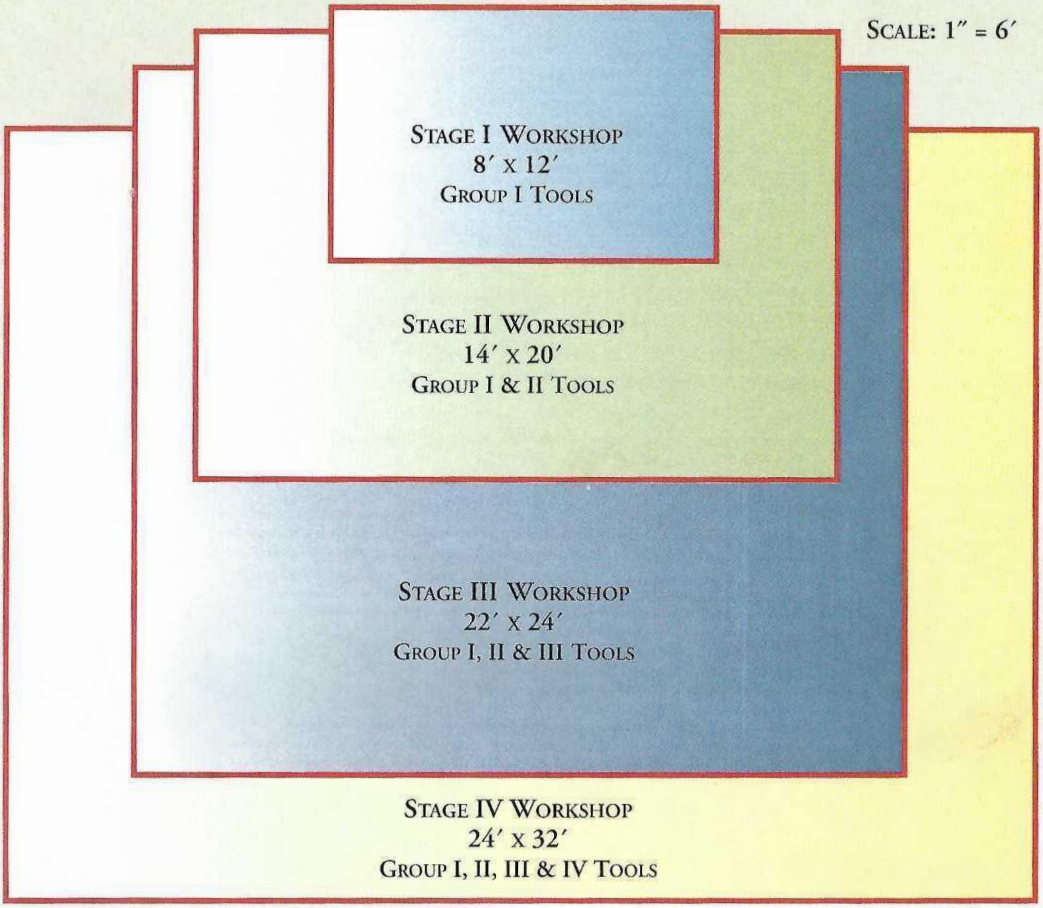
GROUP IV

☐ *Radial-arm saw, floor* $ ____
☐ *Bandsaw, floor* $ ____
☐ *Thickness planer* $ ____
☐ *Wood shaper* $ ____
☐ *Wood lathe* $ ____
☐ *Arc welder* $ ____
☐ *Grinder, rotary* $ ____
☐ *Power drill, 1/2"* $ ____

GROUP V

☐ *Sander, random orbit* $ ____
☐ *Sander, surface* $ ____
☐ *Power planer* $ ____
☐ *Miter saw, compound** $ ____
☒ *Wire-feed welder* $ ____
☐ *Sawdust collector* $ ____
☒ *Reciprocating saw* $ ____
☐ *Hammer drill* $ ____

**Note: As floor model tools are added, bench tablesaw can be used for cutting small parts; bench drill press for sanding or horizontal boring; bench bandsaw for small projects, and first miter saw for cut-off work.*



SIZING UP YOUR WORKSHOP NEEDS

As a practical matter, workshops can be set up just about anywhere space is available. But if you set up in a basement, consider adding a sawdust collection system. While new tools are designed to control sawdust as much as possible, central collection systems are effective and economical to install. A system can be designed to fit your shop's needs.

☐ The 8′ x 12′ Stage I Workshop providing 96 sq. ft. can be set up in a basement or along the end wall of a garage. Open shelving can house portable tools and materials.

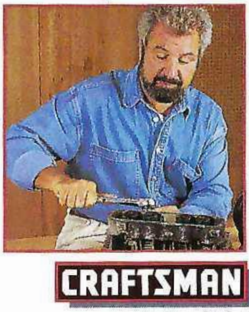
☐ The 14′ x 20′ Stage II Workshop with 280 sq. ft. of space can also fit in a basement room or in a single-car garage. Open shelves and cabinets can be used for storage.

☐ The 22′ x 24′ Stage III Workshop offers 528 sq. ft. in either a large basement room or two-car garage. Storage can be open shelves, cabinets, and under-bench shelves.

☐ The 24′ x 32′ Stage IV Workshop with 768 sq. ft. would require the equivalent of a three-car garage or a separate building. Open shelving, cabinets, under-bench shelves, and special racks can provide storage.

SHOP SET-UP TIPS

If you set up your workshop in a garage or a separate building, give the heating/cooling system top priority. It will add greatly to your enjoyment. Whatever source you use, be sure to check its limitations around dust particles or paint vapors. Wherever you live, adding insulation will add to your comfort and save on utility bills. Also take advantage of an attic ventilation system if you set up in either a home garage or other building.

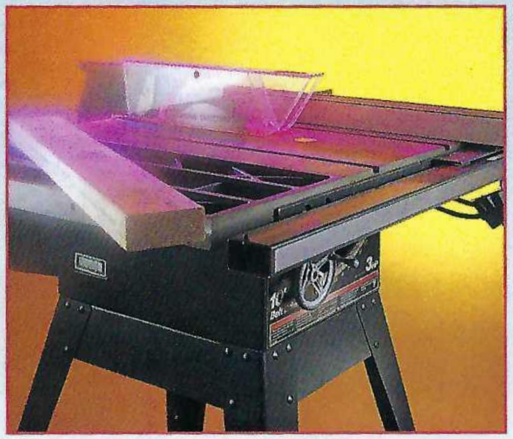


THE WELL-EQUIPPED WORKSHOP

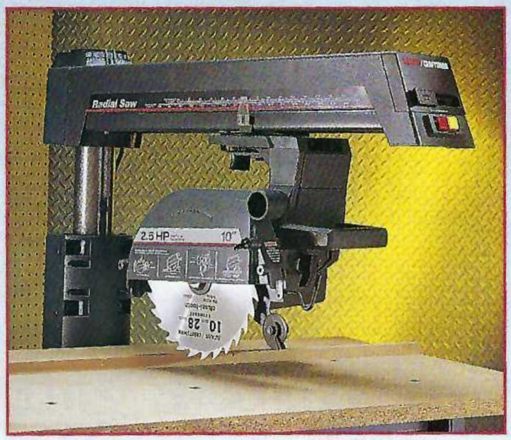
If there is one piece of advice that rings true to a good craftsman pursuing perfection it is: "If you don't begin a project right, you won't be able to finish it right."

Any workshop project can suffer in the final stages from a wrong cut or a wrong measurement. But if you don't start the project by processing the wood with sharp blades, using equipment adjusted to produce clean square dimensions, you will be starting off on the wrong foot. From then on, you will be stuck with problems throughout the project, the same as not getting the foundation square when you are building a house.

The basis of woodworking project success is achieving the highest degree of accuracy possible. Professionals have the advantage of processing lumber starting with ultra-accurate saws. Then they will follow using properly adjusted equipment like planers and jointers to achieve precise dimensions of their project wood. The lesson is to buy the best equipment you can afford, then keep your tools equipped with high-quality blades and



1 TABLESAW. Often a first choice of many shop owners, motors range from 1 to 3 horsepower, though 1½ hp is often adequate for home workshops. Most tablesaws sold are belt-drive models.



2 RADIAL-ARM SAW. A versatile alternative to the tablesaw, it does all cutting operations plus much more with accessories. Blades range from 8" to 16"; those with a 10" blade are most popular.

5 WOOD LATHE. A favorite tool in many workshops, the lathe is sized by the diameter of the piece that can be turned. Distances between the headstock and tailstock can vary from 36" to 39".

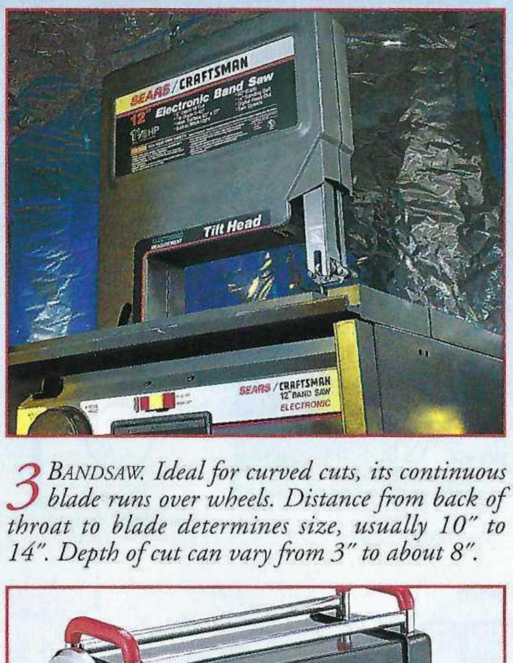
6 DRILL PRESS. Besides drilling, it can be adapted for many other purposes. Size is determined by double the distance from center of chuck to the column. If it is 7", the drill is considered a 14".

adjusted with as much precision as you can possibly muster.

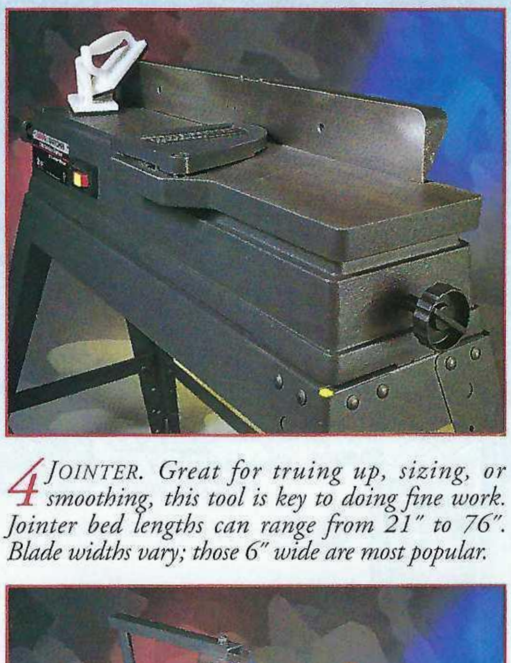
Below is a listing of the basic tools you will find in a well-equipped workshop used for woodworking. You might consider them the workshop "Big Eight." Realize that if you acquire these eight tools, plus the knowledge to use them properly, your project work will improve because you will start with wood that is square, true, and correctly sized.

If you don't have the equipment to process wood for your projects, buying pre-dimensioned wood is helpful, but it doesn't guarantee perfection. Boards can warp or shrink, depending on humidity, over time. Even if you buy processed wood because you don't have a planer, jointer, or shaper, the best bet is to find someone to reprocess that wood for you before you start your project.

As you accumulate the equipment you need, the next challenge is to learn how to fine-tune it for precision. Study the manuals and, if possible, find someone who can help you learn to adjust your tools to fit the job.

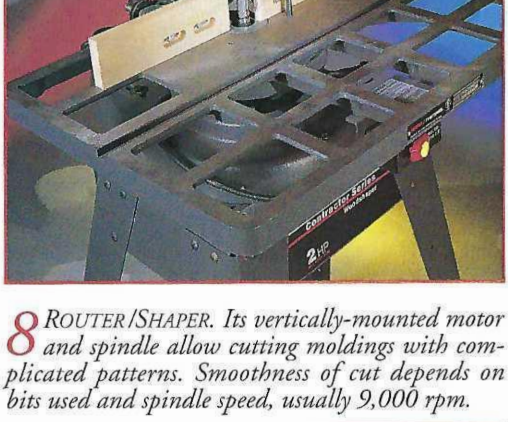


3 *Bandsaw. Ideal for curved cuts, its continuous blade runs over wheels. Distance from back of throat to blade determines size, usually 10" to 14". Depth of cut can vary from 3" to about 8".*



4 *Jointer. Great for truing up, sizing, or smoothing, this tool is key to doing fine work. Jointer bed lengths can range from 21" to 76". Blade widths vary; those 6" wide are most popular.*

7 *Surface Planer. For smoothing or sizing lumber, it is sized according to knife width. A 10" planer will accept boards 10" wide. Feed rates can vary from 11 feet to over 30 feet per minute.*



8 *Router/Shaper. Its vertically-mounted motor and spindle allow cutting moldings with complicated patterns. Smoothness of cut depends on bits used and spindle speed, usually 9,000 rpm.*

MAPPING OUT YOUR WORKSHOP

Laying out a workshop offers a number of advantages over other types of home remodeling. Unless you have a pressing project, you can take more time in the process without disrupting your daily routines. You can arrange your shop a certain way, then if you see a way to improve it you can change it around whenever you have the time.

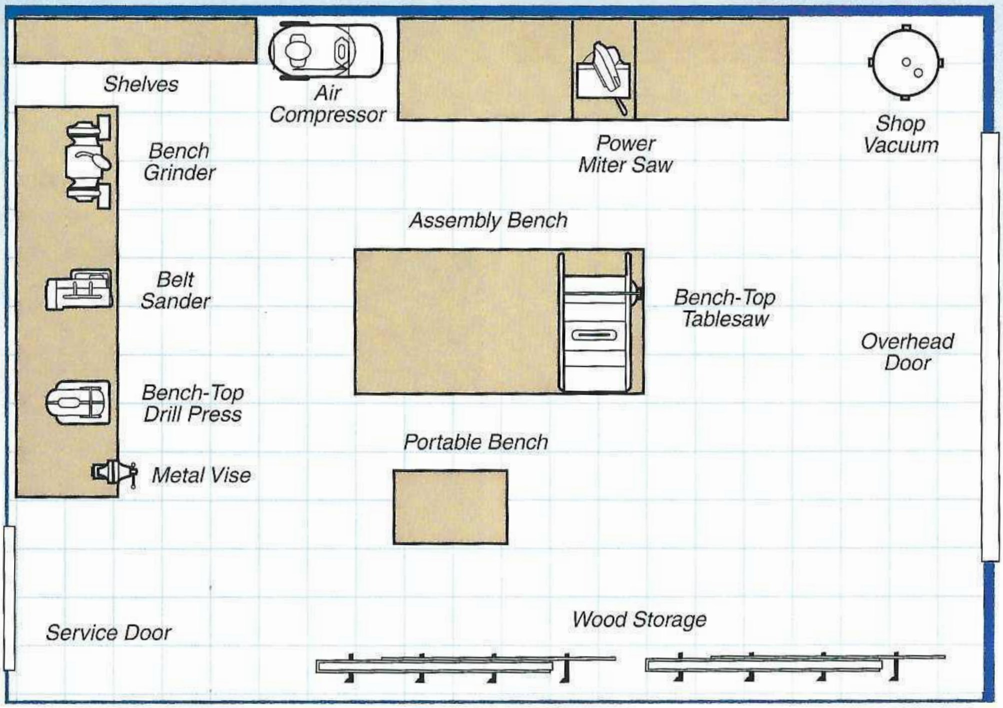
A home workshop is a personal affair. Above all, make it a place of your own. Check other sources for advice, but then use your own ideas and alter basic concepts to fit how you think your workshop will work best. Flexibility is on your side and the final criteria is that it works well for you.

How to start? The floor plans below show a couple of possibilities for a modest-size shop. These, along with the layout on pages 20 and 21, will give you some ideas. Several more shop layout formats can be found in the book *The Home Workshop Planner* available at bookstores or directly from the publisher (see back cover). Keep in mind that built-in benches and cabinets can make your shop look more professional. However, they will also make it harder to rearrange or move your workshop to a different location.

If you are planning your shop from scratch, or are searching for ways to reorganize your shop to work better, start by doing some planning on paper. Assemble a rough drawing using either the layout grid provided on page 15 or a tablet of graph paper with ¼″ squares. First measure the outline of the space that will house your shop. Select a scale, such as ¼″ equals 1′. Then sketch out a diagram of the space, including existing features, such as service doors, overhead doors, windows, electrical outlets and fixtures, plumbing lines, and so on.

Start your shop layout by sketching in main benches and any storage fixtures. If

EXAMPLE STARTER WORKSHOPS Grid Scale: ¼″ = 1′



Shop Area 14′ x 20′

possible, place main workbenches near windows to take advantage of available natural light. Next, experiment with tool positions. (See page 20 and 21 for tips on arranging tools for better workflow.)

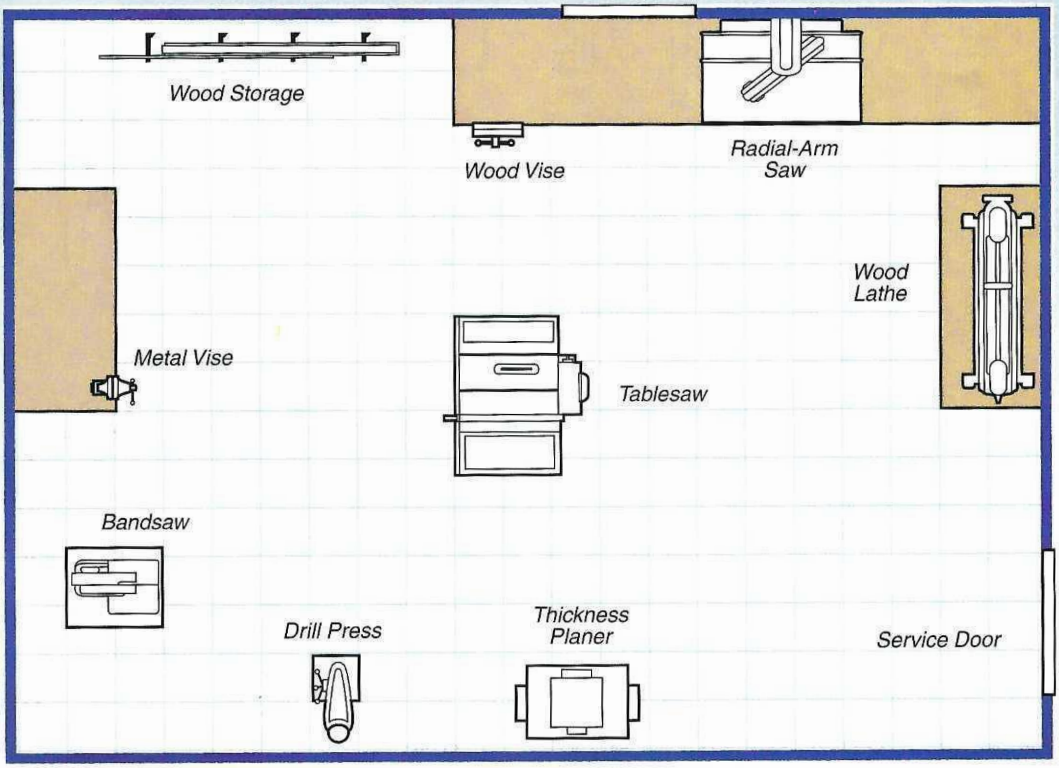
You can use either the tool outlines on page 14, or sketch in your own. The outlines can be photocopied, then cut out and placed on your graph paper. They are sized for a ¼″ = 1″ grid. If you will be using a ½″ = 1″ scale, photocopy them at 200%. Note: If you think you would like to sketch out more than one plan, make extra photocopies of the grid on page 15 before using it.

The goal is to have enough space around each tool for normal project work. Because even floor-model tools can be easily moved around when equipped with casters, you can compensate for a space shortage with a little extra set-up time pulling tools out of a storage position.

One worthwhile idea to consider as you sketch your layout is what designers call "the workstation concept." To incorporate this strategy, break down your projects into subordinate tasks, then group all related accessories and jigs for each of those tasks near the tools needed for that particular task.

SHOP SET-UP TIPS

No matter where you set up shop, chances are good that the space may already be in use. To free up shop space, the first order of business is to reorganize your possessions. First, build or buy plenty of shelving so you can store items in an orderly fashion. Then, if you use boxes, take time to mark both the contents and date clearly on all sides.



Shop Area 15′ x 21′

A WORKSHOP PLANNING GUIDE

Your workshop can be set up in a home basement, garage, or a separate building. Or, if you specialize in smaller project work such as scrollsawing, a porch or spare room can provide the space you need. Some craftsmen in warmer climates set up a bench on a patio or under a sun shelter.

If you have a single-car garage that must be used for a car, you can consider expanding it to make room for a workshop. One way is to split it in half, widen it, and fill in the middle. Another option is to add to the garage lengthwise and use the addition for a shop.

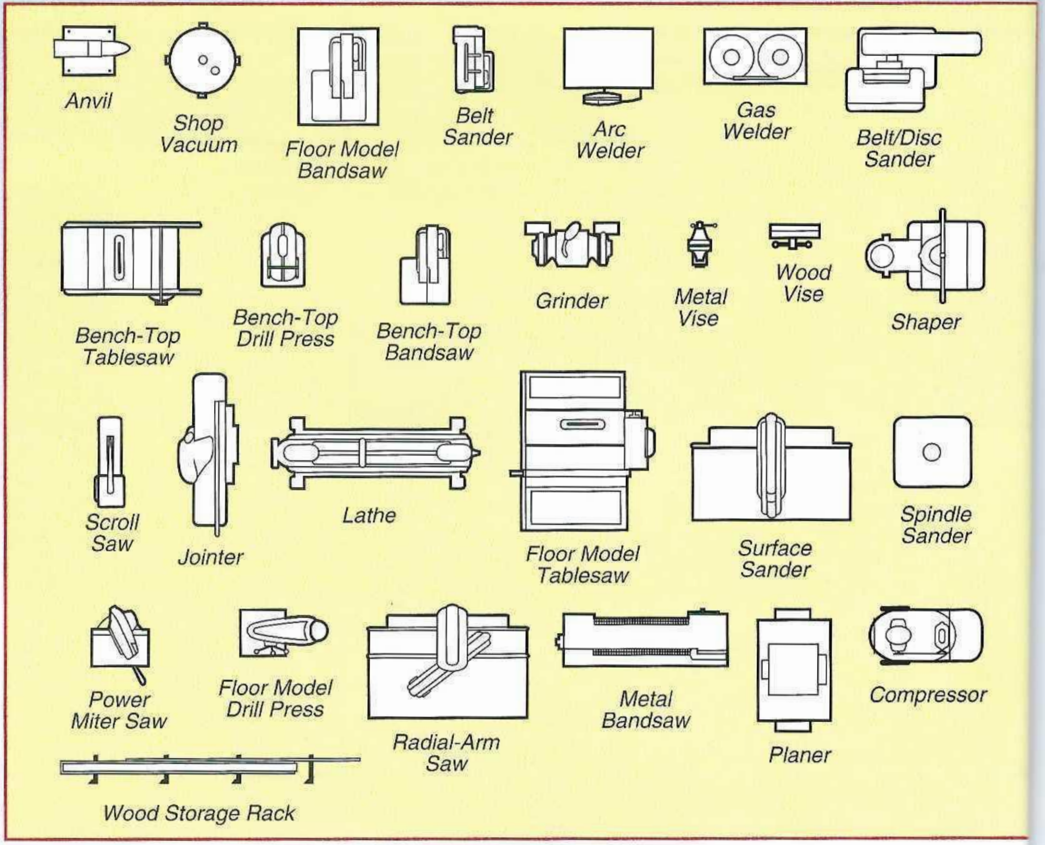
Regardless of where you set up, it can pay to do some planning on paper using the grid on the opposite page (or your own graph paper) and the tool outlines directly below. You can photocopy the tool outlines, cut them out and tape them into position. Or you can simply use them as a guide for making your own sketches.

Map out the perimeter of your shop space, including all doors, windows and fixed built-ins. Note the location of all existing or planned electrical outlets and lighting fixtures. Do a rough calculation of the electrical loads that will be required. Then consider improving the electrical system before finish the walls and move in your tools.

Keep in mind that adequate lighting is essential in a good workshop and will make project work safer and more enjoyable. Consider both natural and artificial light.

When space is short, you also can consider a "center island" of power tools positioned back to back. Instead of running power cords across the floor from a wall outlet, consider installing ceiling outlets above the tools.

Once you have your major tools in position, consider storage of project materials, smaller tools, and accessories: open shelves, cabinets, or rolling carts. Before finalizing your shop layout, check the tips in the rest of this booklet, including pages 20 through 23.



Location: ________________ Scale: ________ Date: ____________

BUYING PORTABLE POWER TOOLS

While hand tools still have their place, the advent of portable power tools has made shop project work less tedius, much faster, and more precise. The photos below show a sampling of portable tools to consider for your home workshop.

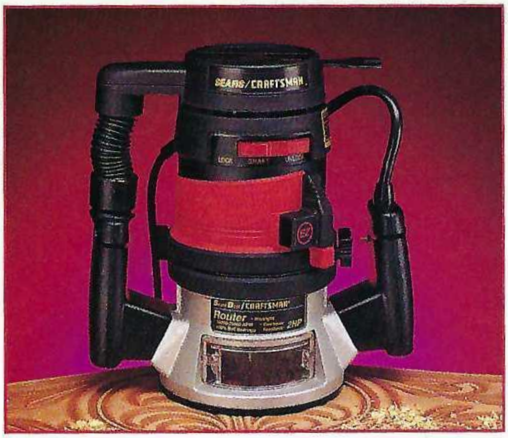
However, remember that the listing below is by no means complete. Besides the tools shown, specialty sanders, air tools, power planers, cordless tools, and high-end industrial-grade tools offer an amazing array of choices for the discriminating tool buyer.

Besides the type of tool, the big question is what grade to buy: lower-priced homeowner tool, light-duty industrial tool, or heavy-duty industrial tool. The answer largely depends on how much use that tool will get.

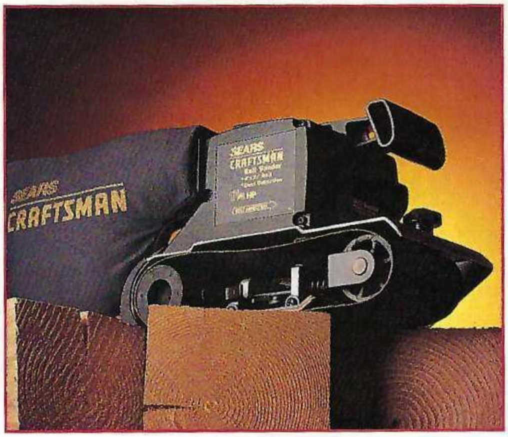
If, for example, you plan only occasional small wood projects, a lower-priced sander should do just fine. But if you plan to use that sander to refinish several wood floors, a big deck and a wooden boat, you may be wise to get a sander rated for industrial use. It's a matter of matching the tool to the job.

1 *POWER DRILL, ⅜". Lower Priced: Drilling in wood, metal, ceramics, glass, or light sanding. Higher Priced: Using hole saws, drilling in masonry or thicker metals, and driving screws.*

2 *POWER DRILL, ½". Lower Priced: For the shop owner with a ⅜" drill who needs more power. Higher Priced: Heavy use drilling concrete, hardwood, thick metal, and other hard materials.*



5 *ROUTER. Lower Priced: Hanging doors, making signs, trimming plastic, finishing wood joints. Higher Priced: Regular use in general cabinet work, making molding, or leveling wood slabs.*



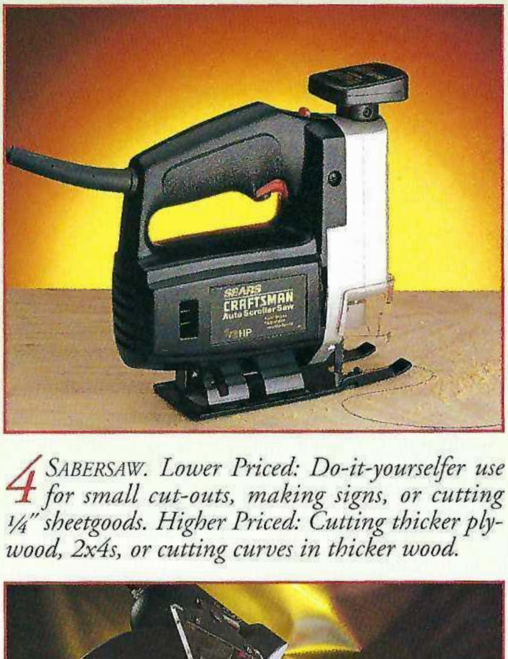
6 *BELT SANDER. Lower Priced: Sanding wood, removing stock, stripping paint, smoothing floors, removing rust. Higher priced: Heavy-duty use for professional-level work or production shops.*

A good rule of thumb is that you generally get what you pay for. Manufacturers must justify higher prices with improved components, such as all ball bearings, machined castings, and heavy-duty motors, brushes, gears, cords, and switches.

No matter what type of tool you buy, always remember that much of its performance depends on how it is equipped. An industrial-grade circular saw equipped with a low-priced, worn sawblade, for example, will not perform as well as a lower-priced saw equipped with a quality carbide-tipped sawblade. The same holds true with other tools requiring blades or bits, and with tools outfitted with grinding stones or sandpaper.

Also remember that, regardless of what you pay for a tool, its service life will be shortened if it is abused. Let the tool do the work, and never let it get overheated. With a tool like a sander, for example, the weight of the tool should be enough to do a good sanding job. Applying extra pressure may speed up the job, but will also reduce service life.

3 *CIRCULAR SAW. Lower Priced: Occasional projects building small garages, remodeling rooms, erecting fences. Higher Priced: Regular use for rough and finish cuts in construction projects.*

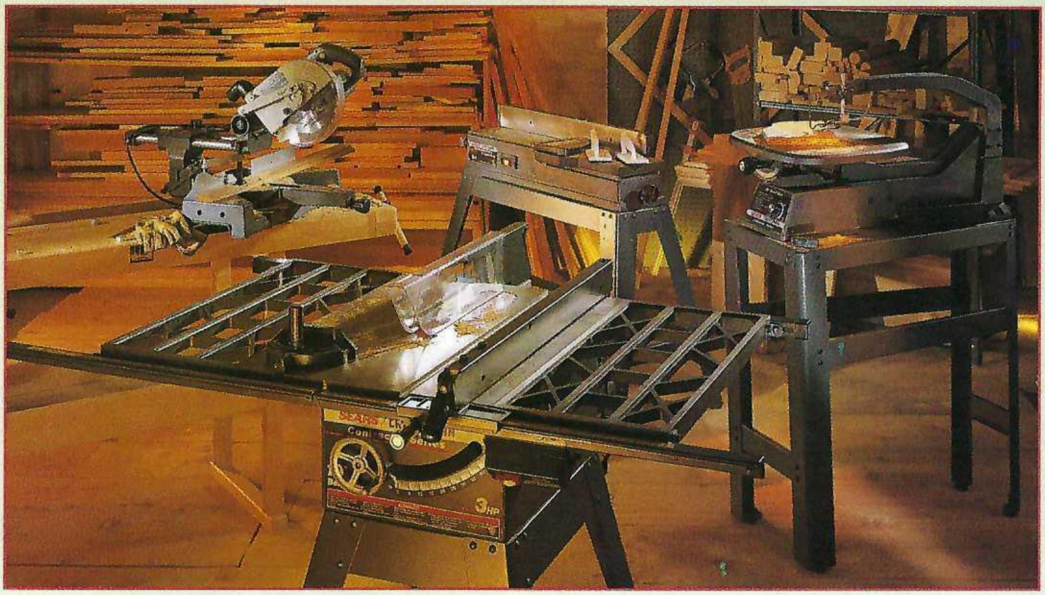


4 *SABERSAW. Lower Priced: Do-it-yourselfer use for small cut-outs, making signs, or cutting ¼" sheetgoods. Higher Priced: Cutting thicker plywood, 2x4s, or cutting curves in thicker wood.*

7 *FINISHING SANDER. Lower Priced: Occasional refinishing and smoothing wood or other materials. Higher Priced: Regular use smoothing materials or sanding finishes between coats.*

8 *BENCH GRINDER. Lower Priced: Sharpening tools, cleaning, buffing, and polishing. Higher Priced: Regular use with more horsepower, heavier construction, greater wheel to motor clearance.*

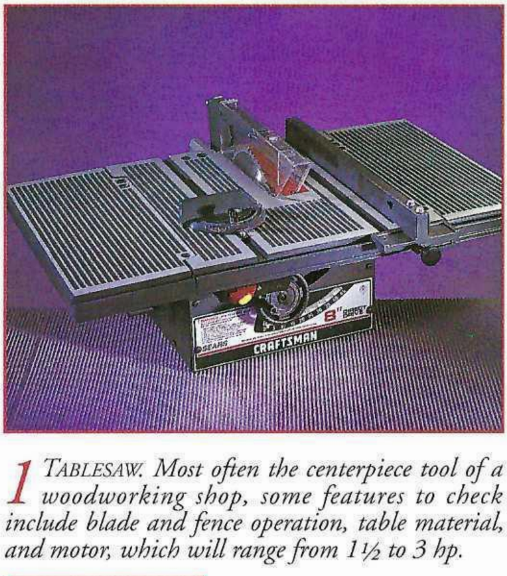
SELECTING A MAJOR SHOP SAW



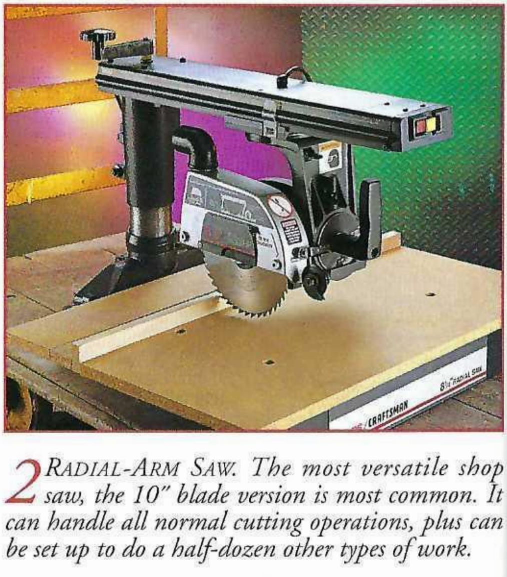
In most woodworking shops the power saw does the bulk of the work. About 80% of shop operations involve cutting wood, and about 75% of the cuts will be straight cuts. Though many advanced shop owners will have several types of saws in their workshops, they will tend to use one major saw for most of their work. And it likely will be a higher-quality tablesaw.

Still, there are exceptions. For some the radial-arm saw is the tool of choice. Others prefer a bandsaw if curved cuts are needed most often. Some shop owners limited on space will get by fine with a moderately-priced power miter saw, either a fixed head, compound, or sliding compound model.

Which saw should you buy? As explained in the book *The Home Workshop Planner*, the choice basically boils down to your experience level, your budget, the projects you are planning, and—last but not least—whether you are willing to invest time to learn how to



1 TABLESAW. Most often the centerpiece tool of a woodworking shop, some features to check include blade and fence operation, table material, and motor, which will range from 1½ to 3 hp.



2 RADIAL-ARM SAW. The most versatile shop saw, the 10" blade version is most common. It can handle all normal cutting operations, plus can be set up to do a half-dozen other types of work.

take full advantage of that saw's capabilities.

The tablesaw and radial-arm saw operate on different principles. The radial saw has the blade suspended over the table and will seem to work upside down or backwards if you are used to a tablesaw. Many woodworkers who have both types will often use the radial-arm saw mainly for cross-cutting. Even some experienced woodworkers only use about 20% of its capabilities.

However, the radial-arm saw can offer even more versatility than a tablesaw. Properly equipped and operated, it can dado, rip, shape, sand, dovetail, mortise, mold, rout (with adapter), wire-brush, grind, buff, and perform many other operations. Studying the manual is the key with this tool.

A bandsaw may be a third alternative as a first saw if your projects involve curved cuts. However, many woodworkers who buy a bandsaw first will often supplement it later with a tablesaw or radial-arm saw.

After you decide on the saw type, the next question is whether to buy a bench-top or floor model. Today, bench-top saws can offer as much accuracy, performance, and precision as their floor-model cousins. Check them out, especially if you are short on budget or shop space. If you opt for bench-top models and want them off the bench, mount them on tool stands or inset them into the bench.

With any saw, check whether motors and drive belts are readily available and easy to replace. Check the heft of the saw; the heavier the better. On a tablesaw, check to make sure the blade and fence mechanisms are of quality materials. On a radial-arm saw, check how adjustments are made and how well the saw holds settings. On a bandsaw, check the table supports, the blade guides, and the wheel construction.

Finally, on any saw check the quality of the blade that it comes equipped with; a high-quality blade reflects on the quality of the saw. Keep in mind that if a saw is sturdily made, can be easily adjusted, and will hold its adjustments, you will find it easier to accomplish precision, professional-level work.

SHOP SET-UP TIPS

Before you buy your first saw, do some research. Visit other shop owners and ask what they would buy first, second, third, etc. Also take advantage of trained sales associates where you buy the saw. Let them explain the differences among various types and models. They also can refer you to other sources, such as books, video tapes, or classes in your area.

3 BANDSAW. The tool of choice for curved cuts, blades from ⅛" to ¾" travel over two or three wheels. The distance from the saw's blade to the back of the throat can vary from 10" to 16".

4 MITER SAW. Great for cut-off work, these are available in fixed head, compound, and sliding compound versions. They typically have a 10" blade, powered by a 1½-hp direct-drive motor.

ORGANIZING WORKSHOP TOOLS

When setting up a home workshop, it will pay to think about how to position tools to help, rather than detract from, efficient project workflow. The 24′ x 32′ shop shown here uses the space equivalent to a three-car garage. It can give you some ideas on how to position tools to your best advantage, even if your own workshop is smaller.

For example, wood for projects can be easily moved from storage to the radial-arm saw for rough cutting to length. Then wood surfaces and edges can be processed through the nearby jointer, and next run through the thickness planer which is also close at hand.

The main assembly table in the workshop is located close to both the bench-top tablesaw and the power miter saw. Since both of these tools are typically used for cut-off work, it helps make parts fitting and assembly work more convenient.

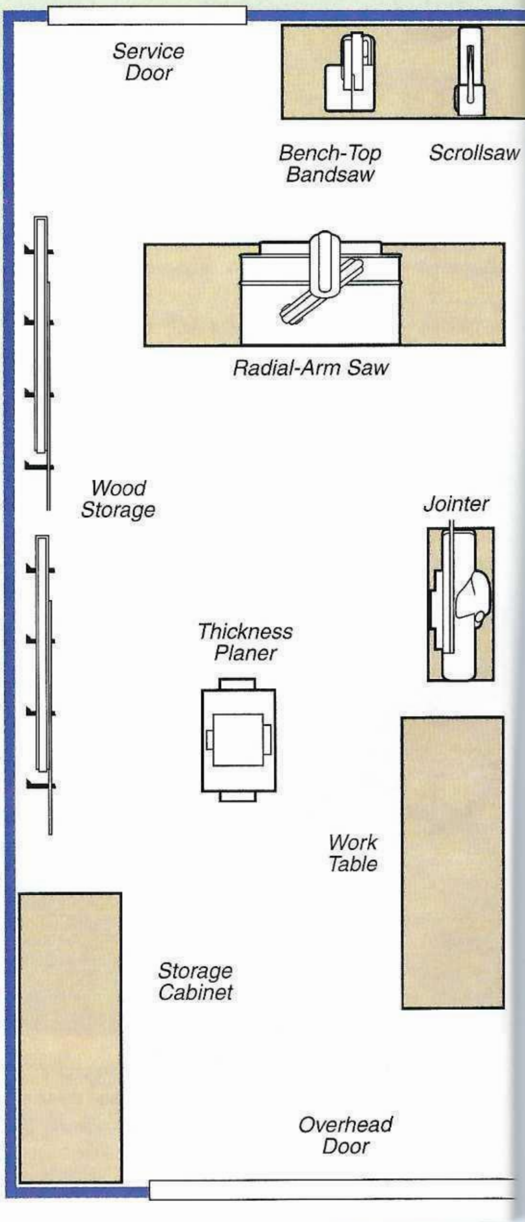
In addition to the main assembly table, this shop has three other work tables; two of them are for handling wood and one is for handling metal. The larger table on the left side of the shop is near the jointer and planer, and the smaller table in the center of the shop is adjacent to the tablesaw. One or both of these tables could be replaced with wheeled carts to provide easier movement of wood and partially completed projects.

The metal-covered work table at the right side of the shop is near the welders, drill press, and bench grinder. Close to these metal-working tools is a portable rolling cart which can be used to carry hand tools. Also on the right side of the shop is a 1″ belt sander which is positioned close to the wood lathe for sharpening turning tools.

The assembly and work tables in the shop are all kept at the same height as the surface of the tablesaw and jointer tables. This eliminates any need for outboard supports when stock is being processed. Likewise both the miter saw and the bench-top tablesaw can be inset into their workbenches so their tables are the same height as the bench surfaces.

Depending on which projects are built most often in the shop, the work tables and benches can be outfitted with woodworking and metalworking vises as needed. For greater fire safety, the metalworking corner of the shop is best partitioned off with stud walls covered by thin-gauge steel panels. If the shop is used only for woodworking, the extra space in the lower right-hand corner could be used for a design center or as a fully partitioned shop office.

Project wood is stored on open racks on the opposite end of the shop from the metalworking area. The wood can be protected with a canvas drop front. Other ideas to keep in mind:



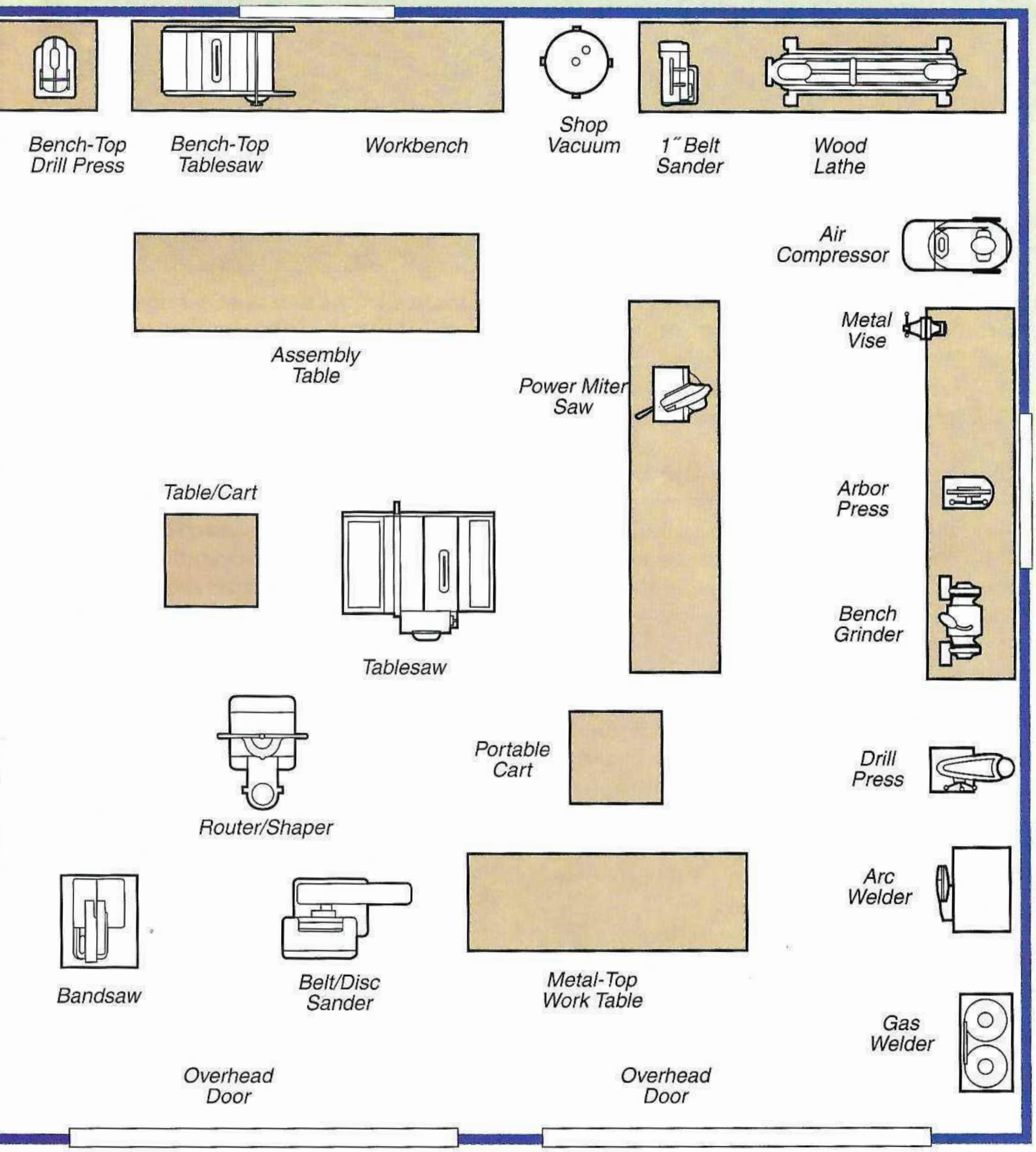
❑ If you are building a bench or table that won't be used for off-feed support for materials being processed, some general height recommendations include either 34″ high, knuckle high, or hip-pocket high.

❑ Generally allow about 2″ from the back of the tool to the wall, but be sure to leave space for any sawdust collection equipment you plan to install, including the ductwork and any attachments to it or to the tool.

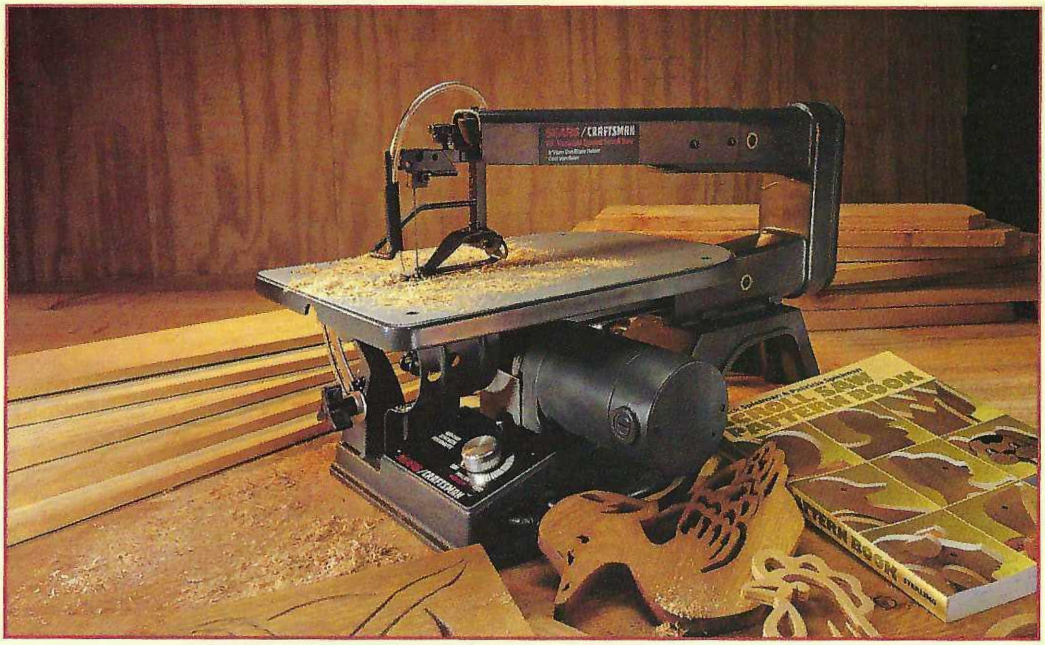
❑ Use mobile bases or casters on equipment if workshop space is at a premium. Then you can move a saw or other tool in line with doors or windows when needed to process long boards or material.

❑ If space is tight, consider using a panel saw to cut large sheets down to smaller sizes instead of setting up to handle them full size.

❑ When building overhead shelves, consider that a comfortable vertical reach is from 77″ to 88″. Normal horizontal reach ranges from about 15½″ to 20″.



GIVE YOUR SHOP A HEAD START



Setting up your own workshop gives you the opportunity to put good ideas to work. But the best ideas often don't come all at once. You can use the best ideas available at the time, then modify your shop as you discover better ways.

An excellent source of shop layout ideas is other shop owners. Take every opportunity you get to visit other shops and ask the owners what works well for them and what could be set up better. Chances are good that every shop you visit will generate at least one new idea that you can put to use in your own shop. Meanwhile, here are more tips:

☐ When setting up a shop, make as much use of natural light and ventilation as possible. A rule of thumb is that windows and skylights should make up at least 10% of your shop's total square footage. Try to use doors large enough to allow easy movement of raw materials and finished projects.

☐ Be generous with your electrical budget when setting up a shop from scratch. Do the electrical work before building benches or moving in tools. Install more circuits, lights, and outlets than you think you will need.

☐ For the all-around modern workshop that depends heavily on power tools, the minimum electrical service should be 200 amps and 240 volts. When wiring your workshop, work with local building and electrical officials and follow all safety precautions.

☐ To rough out your shop's electrical system, first figure the power wattage requirement for all lighting and tools. (Two helpful formulas are volts x amps = watts, and watts divided by volts = amps.) Generally the maximum load for a 15-amp circuit using either 14-gauge or 12-gauge wire should be less than about 1,500 watts. For a 20-amp circuit using 12-gauge wire, it is about 2,000 watts.

☐ Try to set up the electrical system of your shop so that all power tool circuits can be shut down at one secondary load center. Try to have lighting fed from more than one circuit so that if one circuit trips the shop won't be in total darkness.

☐ A rule of thumb is that you can put from 8 to 10 lights or outlets on a circuit, but check with local officials. Basically you can install as many outlets as you wish, as long as you have enough circuits to handle them. In some cases, outlets and lights can be on the same circuit, but a load on an outlet may cause the lights to flicker.

☐ Locate outlets uniformly over workbench areas, near every motor-driven tool, and around the shop's perimeter, 4′ above the floor. Ground-fault circuit interrupters (GFCIs) are recommended on all 20-amp outlet circuits and are also required for any outside outlets.

☐ Having electrical outlets about every 3′ in your workshop will help eliminate extension cords. Stumbling over extension cords, using cords to get to hard-to-reach outlets, and dealing with tangled cords present dangerous situations, slow efficiency, and boost frustration levels. Ceiling outlets can help reduce dependence on extension cords.

☐ For most workshops, minimum lighting is about ½ watt of fluorescent lighting, or 2 watts of incandescent lighting per square foot of shop floor area. If you use 48″ double-tube fluorescent fixtures above benches, mount them about 4′ above the workbench surface, over the front third of the bench.

☐ For extra lighting for project work, check out trouble lights, task lights that can be clamped near areas like vises and drill presses, or the newer halogen utility lights, which can flood a shop with as much light as you need.

☐ Whether you set up in a basement, garage, or separate building, realize that good insulation will help reduce noise, as well as increase comfort levels. If possible, insulate the walls of your shop to the maximum R-values recommended for your area.

☐ Painting the interior of your shop a light color can help you see better with whatever light is available. A light green, for example, will reflect light at a rate of about 41%, while medium gray will reflect about 43%, beige 66%, light ivory 71%, and white 80%.

☐ A good way to help organize your shop is to use plenty of pegboard. Newer pegboard hooks resist pull-out and, with brackets and other accessories available, provide visible storage of small tools. If using older-style hooks, applying hot-melt glue can help keep them in place.

☐ Consider using latches, instead of knobs, on shop doors to allow easy opening in emergencies. Have safety gear, such as smoke alarms and fire extinguishers installed and maintained. Also set up a first-aid area.

SHOP SET-UP TIPS

Don't forget about storage of project material. You can use stationary racks, even portable racks on casters, divided into sections for various lengths of stock. Racks of pipe hung from the ceiling can work, as well as racks 6′ high and a few inches wide set behind workbenches. If you are short on space, you can build hinged bench surfaces that can be folded up out of the way when you want to use the space for other purposes like car storage.

MAKING YOUR SHOP A PLEASANT PLACE TO WORK

The perfect time to make your workshop user-friendly is when you are setting up. Sawdust, wood chips, poor lighting, and foul air all can drag down shop efficiency and enjoyment.

Having a clean, well-lighted shop will go a long way toward providing a craftsman-like atmosphere. At the very least, buy a good shop vac. Because it makes it easy to clean up your shop, you are likely to do it more often.

Wet/dry vacs and larger dust collectors can be hooked up directly to tools, or to a central vacuum line with shut-offs at each tool. When you buy smaller portable power tools, make sure they can be fitted with dust bags.

You can rig up special sanding tables that draw sawdust away while sanding. In some cases you can add exhaust pipes from such tools as miter saws to shoot sawdust into a box, or rig up chip collection boxes for planers and jointers.

Set up a special, well-ventilated area within your shop to apply various finishes, or to accomplish other work involving fumes, like refinishing old furniture. Also investigate methods of using fans in your shop, including shop-built units, to exhaust fumes from your workplace.

FOR MORE TIPS ON SETTING UP YOUR HOME WORKSHOP, TUNE INTO BOB VILA'S HOME AGAIN

For the seventh season of the nationally syndicated half hour series, BOB VILA'S HOME AGAIN will center around the remodeling of a gracious Shingle Style home in Cambridge, Massachusetts. As part of each episode, you'll spend time in the basement where Bob is creating the perfect workshop for weekend projects, accessible and user-friendly not just for the handyman, but his wife and kids as well. There will be a great emphasis in this series on setting up the shop and stocking the shelves for quick, fun projects the whole family can work on. Projects such as a doghouse, outdoor furniture, child's desk, recycling bins, storage and kitchen accessories. Bob will give you a clear idea of what you'll need to build your own home workshop; the basics like portable table saw, hand tools, craft tools, a good workbench with vises, sufficient lighting, and ample storage for both large and small items. Each week on the show, Bob will give you helpful tips on how to get the job done right and what tools are needed to do it.

BOB VILA'S
HOME AGAIN

Check your local listings for exact dates, times and channel in your area.

WEIGHTS, MEASUREMENTS & CONVERSIONS

HOUSEHOLD MEASURES

(Standard measuring spoons and cups filled level)

60 drops	1 teaspoon
8 saltspoons	1 teaspoon
3 teaspoons	1 tablespoon
1 tablespoon	1/2 fluid ounce
4 tablespoons	1/4 cup
16 tablespoons	1 cup
8 fluid ounces	1 cup
2 cups	1 pint
2 pints	1 quart
4 quarts	1 gallon
1 pound	16 ounces

METRIC EQUIVALENTS

1 centimeter (cm.) =10 millimeters (mm.) = 0.3937 in.
1 meter (m.) = 100 cm. = 1000 mm. = 3.281 ft., 1.0936 yd.
1 kilometer (km.) = 1,000 m. = 1093.6 yd., 0.62137 mile
1 inch (in.) = 2.54 cm.
1 yard (yd.) = 0.914 m.
1 mile = 1.6093 km.
1 nautical mile = 6,080 ft. = 1.853 km.

WEIGHT EQUIVALENTS

1 gram (gm.) = 0.035 oz. avoirdupois
1 ounce avoirdupois = 28.352 gm.
1 lb. = 0.4536 kg.
1 kilogram (kg.) = 1000 grams = 2.20462 lb.
1 metric ton (m.t.) = 1,000 kg. = 2,204.62 lbs. = 1.102 U.S. tons
1 U.S. ton = 2,000 lbs. = 0.907 m.t.

VOLUME EQUIVALENTS

1 liter = 61 cu. in. = 0.035 cu. ft. = 1.760 pt. = 0.22 Imp. gal. = 0.264 U.S. gal.
1 pint = 34.62 cu. in. = 0.568 liter
1 cubic cm. (water) = 1 gm.
1 U.S. gallon (liq.) = 0.833 Imp. gal. = 3.785 liters
1 Imp. gallon (liq.) = 1.20 U.S. gal. = 4.54 liters
1 U.S. gallon (dry) = 1/8 bu. = 4.505 liters
1 U.S. quart (liq.) = 2 pt. = 0.946 liter
1 Imp. barrel (liq.) = 36 Imp. gal. = 1.64 hectoliters
1 U.S. barrel (liq.) = 31.5 U.S. gal. = 1.19 hectoliters
1 U.S. barrel (oil) = 42.1 U.S. gal. = 1.59 hectoliters
1 hectoliter = 0.840 U.S.barrel (liq.) = 0.629 U.S. barrel (oil)

POWER EQUIVALENTS

1 kilowatt = 1,000 watts
1 kilowatt = 1.36 horsepower
1 kilowatt = 44,260 foot pounds per minute (ft. lb./min.)
1 kilowatt = 56.89 British thermal units (BTU)/min.
1 horsepower = 746 watts
1 horsepower = 33,000 ft. lb./min. = 550 ft. lb./sec.
1 horsepower = 42.41 BTU per min.
1 BTU = 778 ft. lb.
1 BTU = 0.2930 watt-hour

CUBIC MEASURES

1 cu. inch = 16.39 cu. cm.
1 cu. foot = 1,728 cu. in. = 0.02831 cu. m.
1 cu. yard = 27 cu. ft. = 0.7646 cu. m.
1 British ton = 1.555 cu. yd. = 1.189 cu. m.

DECIMAL EQUIVALENTS

1/16 = .0625
1/8 = .1250
3/16 = .1875
1/4 = .2500
5/16 = .3125
3/8 = .3750
7/16 = .4375
1/2 = .5000
9/16 = .5625
5/8 = .6250
11/16 = .6875
3/4 = .7500
13/16 = .8125
7/8 = .8750
15/16 = .9375

SQUARE EQUIVALENTS

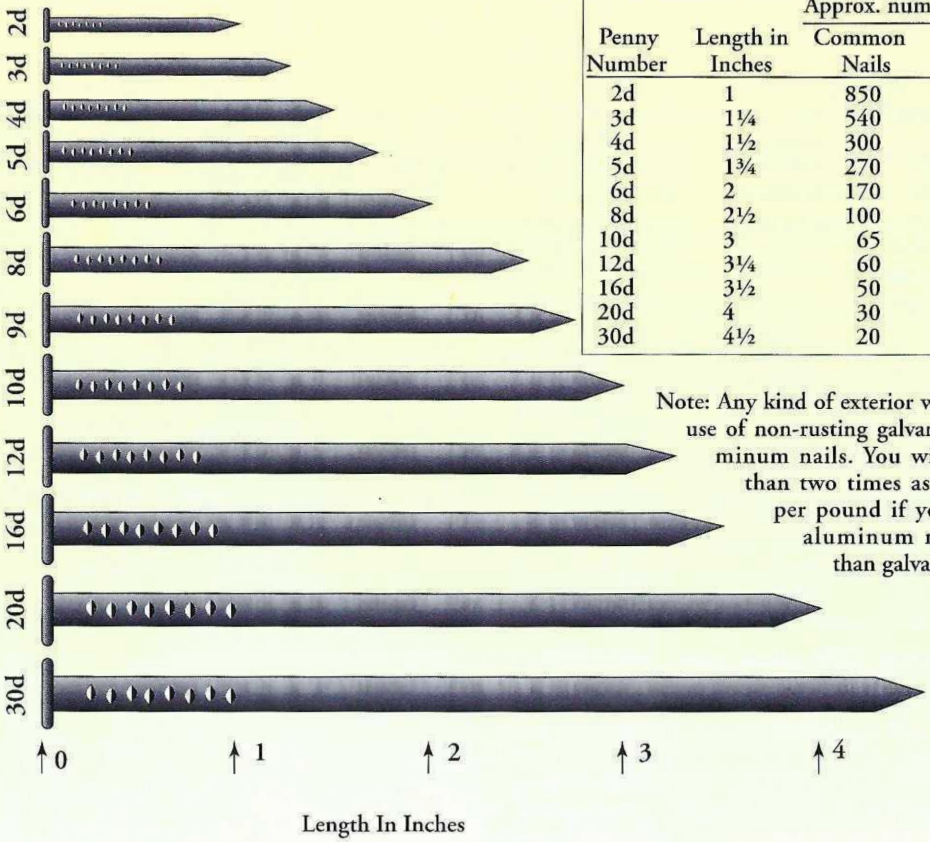
1 sq. centimeter = 0.155 sq. in.
1 sq. meter = 10.764 sq. ft. = 1.196 sq. yd.
1 sq. kilometer = 100 hectares = 0.386 sq. mi. = 247.36 acres
1 sq. inch = 6.451 sq. cm.
1 sq. foot = 9.29 sq. decimeter
1 sq. yard = 0.836 sq. m.
1 sq. mile = 2.5899 sq. km.
1 hectare = 10,000 sq. meters = 1,1960.3 sq. yd. or 2.4736 acres

LAND MEASURES

1 hectare = 2.47 acres
1 sq. kilometer = 0.3861 sq. mi. = 100 hectares = 247 acres
1 acre = 0.40468 hectare
1 sq. mile = 2.59 sq. km.
1 sq. U.S. mile (section) = 2.50 sq. km.
1 sq. U.S. township (36 sections) = 90 sq. km.
1 acre = 43,560 sq. ft.

HANDY WORKSHOP REFERENCES

READING NAIL SIZES



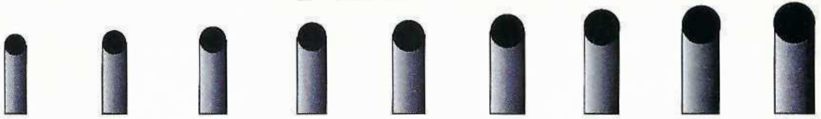
NAIL SIZES AND NAILS PER LB.

Penny Number	Length in Inches	Approx. number per lb. Common Nails	Finishing Nails
2d	1	850	1300
3d	1¼	540	880
4d	1½	300	600
5d	1¾	270	500
6d	2	170	300
8d	2½	100	200
10d	3	65	120
12d	3¼	60	110
16d	3½	50	90
20d	4	30	60
30d	4½	20	---

Note: Any kind of exterior work requires use of non-rusting galvanized or aluminum nails. You will get more than two times as many nails per pound if you purchase aluminum nails rather than galvanized steel.

WOOD SCREW DRILL GUIDE

Screw numbers refer to the shank diameter. Screws are sold by number designation in the length needed: i.e., 1½″ - #10 on the box indicates a screw 1½″ long, #10 shank size.



Illustrations Are Actual Size In Inches

SHANK SIZE	#4	#5	#6	#7	#8	#9	#10	#11	#12
Body diameter (inches)	.112	.125	.138	.151	.164	.177	.190	.203	.216
Shank hole (wood drill)	7/64	1/8	9/64	5/32	11/64	3/16	3/16	13/64	7/32
Thread hole (soft wood)	3/64	1/16	1/16	1/16	5/64	5/64	3/32	3/32	7/64
Thread hole (hardwood)	1/16	5/64	5/64	3/32	3/32	7/64	7/64	7/64	1/8

ACTUAL LUMBER SIZES

Lumber is usually sold by "nominal size," and actual size is somewhat smaller. A 2x4, for example, is typically 1½″ x 3½″ when well-seasoned and dry. (Green or wet lumber may be somewhat larger than this, but should dry down to the standard size.)

While much lumber is priced by the piece, prices are also quoted by the 1,000 board feet (bd. ft.), especially in larger quantities. A board foot is the equivalent of a nominal 1″ board, 12″ square; in other words, 144 cu. in. of wood (before being planed down to final size). Therefore, a 1x12 6′ long is considered to be 6 bd. ft. Likewise, a 2x6 6′ long is also considered to be 6 bd. ft.

The chart below shows actual sizes of dry lumber for various common nominal sizes. It also shows the board feet for each foot of length, and the total feet of length in 1,000 bd. ft.

Plywood, hardboard, and particle board (sometimes called chip board or flake board) are sold by actual size in thickness, width, and length. Hardwoods for furniture and woodwork are usually available in actual or nominal sizes—be sure to specify which you need.

SHOP LUMBER GRADES

The lumber grades below are often used in shop projects other than fine cabinetry or furniture.

No. 1. Has small tight knots but can be used in many projects where a paint finish is used, or even with stains where the knots add rustic charm.

No. 2. Utility grade, often seen as knotty cedar or knotty pine paneling. Has large knots, but they are tight.

No. 3. Often used for shelving or other projects where appearance is not important, it has strength in spite of knots. Clear strips of wood can often be ripped from this grade.

No. 4 & No. 5. Rough lumber with many imperfections, but useful where the lumber will be concealed or for temporary projects. Use where looks or strength are not important.

FINISHING WOOD GRADES

1 & 2 clear: Used in cabinets or for furniture where only the highest quality of wood is acceptable; free of knots or other types of imperfections.

C select: This grade many have minor imperfections or small knots, though one side is often clear.

D select: May have small, tight knots, but is suitable for many shop projects.

LUMBER DIMENSIONS & QUANTITY DATA

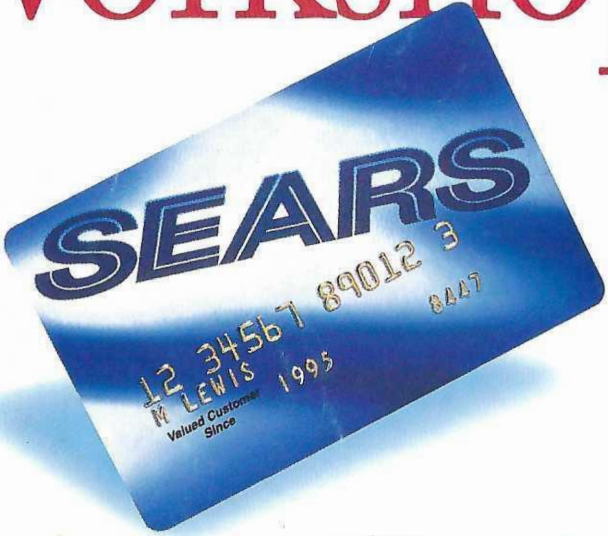
Nominal size (inches)	Typical size (inches)	Board feet per foot of length	Linear feet per 1,000 bd. ft.
1x2	¾ x 1½	⅙	6,000
1x3	¾ x 2½	¼	4,000
1x4	¾ x 3½	⅓	3,000
1x6	¾ x 5½	½	2,000
1x8	¾ x 7¼	⅔	1,500
1x10	¾ x 9¼	⅚	1,200
1x12	¾ x 11¼	1	1,000
2x2	1½ x 1½	⅓	3,000
2x3	1½ x 2½	½	2,000
2x4	1½ x 3½	⅔	1,500
2x6	1½ x 5½	1	1,000
2x8	1½ x 7¼	1⅓	750
2x10	1½ x 9¼	1⅔	600
2x12	1½ x 11¼	2	500
4x4	3½ x 3½	1⅓	750
4x6	3½ x 5½	2	500
6x6	5½ x 5½	3	333

Note: The above chart applies only to framing and ordinary board lumber. Special lumber for decking, flooring, siding, and other specific purposes will most likely have different dimensions. Check actual sizes of specialty purpose lumber before buying.

WOOD DENSITIES

Wood Type	Approx. lbs. per cu. ft.
Ebony, Indian	61
Oak, live	61
Hickory	51
Ebony, African	48
Apple	47
Oak, white	44
Birch, yellow	42
Mahogany, African	42
Maple, sugar	42
Beech	41
Ash, green	38
Larch, western	37
Pine, loblolly	37
Elm, American	35
Walnut	35
Mahogany, Indian	34
Cherry, black	33
Maple, silver	32
Douglas fir	30
Chestnut	28
Cottonwood	27
Poplar, yellow	27
Redwood	27
Spruce, white	27
Basswood	25
Butternut	25
Pine, eastern white	23
Pine, northern white	23
Cedar, southern white	22
Cedar, western red	21
Cedar, northern white	20

your Sears Card is the most important tool in your workshop



extra savings

- Money-saving offer
- Advance notice of sales
- 0% finance charge offers*
- 1%** back in Bonus Club savings
- No annual fee

extra convenience

- Sears Card credit refund without receipt
- Monthly bill payment at the register†
- Temporary shopping pass if your card is lost or stolen††

extra security

- Low monthly payments
- Skip-A-Payment Offers
- Personal Payment Assistance
- Sears Satisfaction Guarantee

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*APR 21% minimum finance charge-50 cents, both lower in some states. Regular credit terms will apply after the 0% finance charge period. **1% in Bonus Club Certificates when Sears Card purchases reach or exceed $300. †If you don't have a receipt when you return merchandise purchased with the Sears Card, your account will be credited for the original purchase price if you return the item to the same store where it was purchased. ††Proper identification needed.